

**THE NEARCTIC SAWFLIES OF THE GENUS HEMITAXONUS ASHMEAD**  
(HYMENOPTERA: TENTHREDINIDAE)

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The genus *Hemitaxonus* belongs to the Selandriinae, a subfamily which reaches its greatest development in the tropical and semitropical regions of the world, especially Southeast Asia and South America, where it is one of the dominant sawfly groups. *Hemitaxonus* is a Holarctic genus occurring chiefly in the temperate regions of eastern Asia and eastern North America; a species from Formosa represents the southernmost occurrence. The first species known from western North America is here described, making a total of four species known from the Nearctic region. One species is known to occur in Europe, and Takeuchi (1941) has recorded five species from the Japanese Empire.

So far as is known, members of this genus feed exclusively on ferns. The known hosts include *Osmunda*, *Onoclea*, and *Athyrium*. Little is known of their biology other than a few life history notes and larval descriptions.

## ACKNOWLEDGMENTS

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**Hemitaxonus** Ashmead

*Hemitaxonus* Ashmead, 1898, Can. Ent. 30:311; Konow, 1905, Gen. Ins. 29:102; Rohwer, 1911, Proc. U.S. Nat. Mus. 41:397; Enslin, 1914, Deutsch. Ent. Zeitschr. Beiheft., p. 206; MacGillivray, 1916, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 46; Malaise, 1931, Ent. Tidskr. 52:140; Malaise, 1933, Ent. Tidskr. 54:56; Conde, 1934, Korresponden. Naturf. Ver. Riga 61:177; Ross, 1937, Ill. Biol. Monogr. 15:64; Takeuchi, 1941, Tenthredo 3:245-249; Ross, 1951, in Muesebeck *et al.*, U.S. Dept. Agr., Agr. Monogr. 2:22.

Type.—*Taxonus dubitatus* Norton, by original designation.

*Epitaxonus* MacGillivray, 1908, Can. Ent. 40:365; Rohwer, 1911, Proc. U.S. Nat. Mus. 41:397 (= *Hemitaxonus* Ashmead); MacGillivray, 1916, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 46; Malaise, 1933, Ent. Tidskr. 54:56.

Type.—*Taxonus albidopictus* Norton, by original designation.

*Sahlbergia* Forsius, 1910, Medd. Soc. Fauna et Flora Fenn. 36:49; Enslin, 1914, Deutsch. Ent. Zeitschr. Beiheft. p. 206 (= *Hemitaxonus* Ashmead).

Type.—*Sahlbergia struthiopteridis* Forsius, monotypic.

Description.—Body long and slender; antenna filiform, first segment globular, second segment as wide as long, third and fourth segments subequal, remaining

segments decreasing gradually in length; clypeus truncate or slightly emarginate; genal carina present; malar area wider than diameter of front ocellus; an elevated circular ridge on the frons posterior to the antennae and including the front ocellus; prepectus present, defined as a distinct sclerite separated from the episternum by a suture, or as a raised ridge separated from the episternum by a furrow; tarsal claws simple or each with a small inner tooth situated some distance from the outer; fore wing with anal cross vein present, proximal anal cell twice the length of the distal anal cell, and Rs + M curved.

#### KEY TO NEARCTIC SPECIES OF *Hemitaxonus*

1. Female ..... 2  
    Male ..... 5
2. Pectus rufous, or, if black, then mesepisternum is entirely black; tarsal claws each with a small inner tooth; prepectus separated by a suture or furrow ..... 3  
    Pectus black, mesepisternum always with a large triangular rufous area; tarsal claws simple; prepectus separated by a suture ..... 4
3. Abdomen black with a central rufous band; prepectus separated by a furrow; sheath short, truncate (fig. 16) ..... **albidopictus** (Norton)  
    Abdomen entirely rufous; prepectus separated by a suture; sheath pointed (fig. 15) ..... **dubitatus** (Norton)
4. Sheath broad at base, ventral margin at a 45-degree angle with dorsal margin (fig. 14); eastern ..... **multicinctus** Hall  
    Sheath narrow at base, dorsal and ventral margins subparallel (fig. 13); western ..... **primarius**, new species
5. Pectus rufous, or, if black, then mesepisternum is entirely black; tarsal claws each with a small inner tooth; prepectus separated by a suture or furrow ..... 6  
    Pectus black, mesepisternum always with a large triangular rufous area; tarsal claws simple; prepectus separated by a suture ..... 7
6. Abdomen entirely black, or, at most, with rufous areas on basal sterna; prepectus separated by a furrow ..... **albidopictus** (Norton)  
    Abdomen with rufous areas on terga 2 to 5 and sterna 1 to 6; prepectus separated by a suture ..... **dubitatus** (Norton)
7. Abdomen rufous or straw-colored; eastern ..... **multicinctus** Hall  
    Abdomen dark rufous or entirely black; western ..... **primarius**, new species

#### *Hemitaxonus albidopictus* (Norton)

*Taxonus albidopictus* Norton, 1868, Trans. Amer. Ent. Soc. 2:213, ♂, ♀; Provancher, 1878, Nat. Can. 10:166; Provancher, 1883, Faun. Entom. Can., Hymen., p. 215; Dalla Torre, 1894, Cat. Hym. 1:110; Dyar, 1897, Jour. New York Ent. Soc. 5:20.

*Taxonus amicus* Norton, 1868, Trans. Amer. Ent. Soc. 2:213, ♂, ♀; Provancher, 1878, Nat. Can. 10:166; Provancher, 1883, Faun. Ent. Can., Hymen., p. 215; Konow, 1891, Wein. Ent. Zeitg. 10:44; Dalla Torre, 1894, Cat. Hym. 1:110; Konow, 1905, Gen. Ins. 29:102; MacGillivray, 1916, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 47; Ross, 1951, in Muesebeck *et al.*, U.S. Dept. Agr., Agr. Monogr. 2:22 (= *albidopictus* Norton).

*Hemitaxonus albidopictus* (Norton), Konow, 1905, Gen. Ins. 29:102; Rohwer, 1911, Proc. U.S. Nat. Mus. 41:398; Ross, 1937, Ill. Biol. Monogr. 15:65; Ross, 1951, in Muesebeck *et al.*, U.S. Dept. Agr., Agr. Monogr. 2:22.

*Epitaxonus albidopictus* (Norton), MacGillivray, 1908, Can. Ent. 40:365; MacGillivray, 1916, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 46.

*Hemitaxonus rufopectus* Rohwer, 1910, Proc. U.S. Nat. Mus. 38:204, ♀; Rohwer, 1911, Proc. U.S. Nat. Mus. 41:398 (= *albidopictus* Norton).

*Hemitaxonus dubitatus* var. *amicus* (Norton), Rohwer, 1911, Proc. U.S. Nat. Mus. 41:397.

*Female*.—Length, 7.0 mm. Head and antennae black; labrum and clypeus white. Thorax black; tegulae and upper angles of pronotum white; pectus and mesepisternum, except upper angle of latter and prepectus, rufous. Coxae orange-yellow with apices white; trochanters white; femora orange-yellow; hind femur with extreme apex black; fore and mid tibiae orange-yellow with basal quarter of each white; hind tibia with basal third white, apical two-thirds black; fore and mid tarsi orange-yellow, infuscated apically; hind tarsus black, basal half of basitarsus white. Abdomen black with sterna 1 and 2 and segments 3 and 4 rufous.

General structure as for genus. Head smooth and shining with fine punctures and short dark hairs on para-antennal fields, supra-clypeal area, malar areas, and genal areas; a narrow area parallel with genal carinae with irregular fine punctures. Clypeus roughened, slightly emarginate. Thorax smooth and shining; prothorax finely punctate; several large punctures present on posterior edge of scutellum; prepectus present as a raised ridge, separated from the episternum by a furrow. Tarsal claws each with a small inner tooth, situated at the base some distance from the outer tooth. Sheath short and truncate (fig. 16). Lance and lancet as in figs. 26, 27, and 28.

*Male*.—Length, 5.7 mm. Color pattern similar to female except the abdomen which is entirely black with rufous areas on sterna 1 to 3. Structure as in female. Genitalia as in figs. 10, 11, and 12.

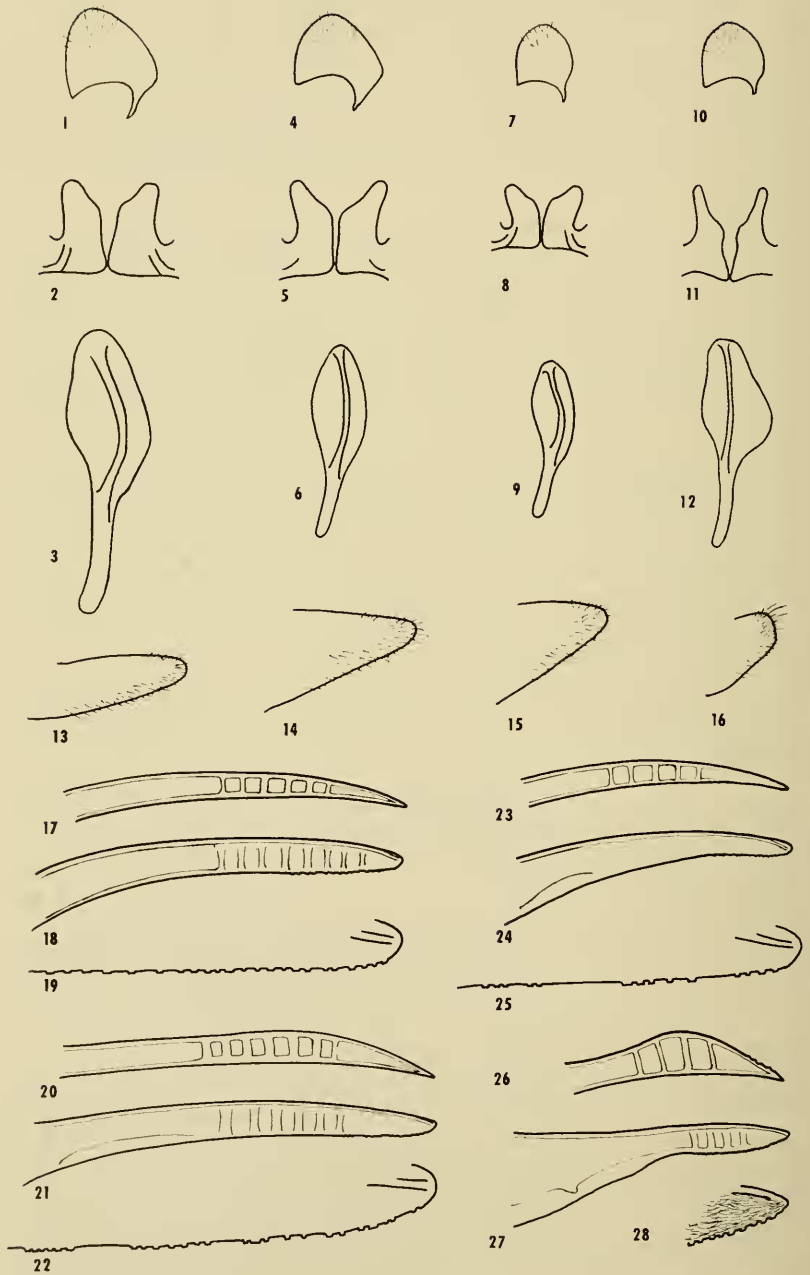
*Types*.—The types of *albidopictus* and *amicus* are in the Academy of Natural Sciences of Philadelphia; *rufopectus* is Type No. 12928 in the U.S. National Museum.

*Type locality*.—Virginia.

*Distribution*.—Eastern North America: Alabama, Connecticut, District of Columbia, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, New Brunswick, Michigan, Minnesota, Missouri, Ohio, Ontario, Pennsylvania, Quebec, Virginia, Wisconsin.

*Hosts*.—*Osmunda*, *Onoclea sensibilis*.

Both sexes of this species may be distinguished from other members of the genus by the prepectus which is present as a raised shoulder and separated from the episternum by a furrow. The coloration, sheath shape, and genitalia are also distinctive. Color variation was noted on the thorax, where the pectus and mesepisternum were either both black or both rufous, but never bicolorous. In the female, various amounts of rufous are present on the abdomen, but the apex is always



black. Also, the male may have an entirely black abdomen or several basal sterna rufous.

The specimen that Norton designated as the male of *Taxonus amicus* is actually a male of *dubitatus*.

Dyar (1897) reared this species on *Onoclea sensibilis*. He described the larvae and indicated that they bore in wood to pupate.

#### *Hemitaxonus dubitatus* (Norton)

*Taxonus dubitatus* Norton, 1862, Proc. Boston Soc. Nat. Hist. 9:119, ♂, ♀; Provancher, 1878, Nat. Can. 10:165; Provancher, 1883, Faun. Ent. Can., Hymen., p. 215; Dalla Torre, 1894, Cat. Hym. 1:110; Dyar, 1897, Jour. New York Ent. Soc. 5:20.

*Hemitaxonus dubitatus* (Norton), Ashmead, 1898, Can. Ent. 30:311; Konow, 1905, Gen. Ins. 29:102; MacGillivray, 1916, Bull. 22, Conn. Geol. Nat. Hist. Surv., p. 46; Ross, 1951, in Muesebeck *et al.*, U.S. Dept. Agr., Agr. Monogr. 2:22; Maxwell, 1955, Can. Ent. 81 (Suppl. 1):48; Krombein, 1960, Ent. News 71:30.

*Female*.—Length, 7.2 mm. Head and antennae black; clypeus, labrum, and base of mandibles white. Thorax mostly rufous except the cervical sclerites, lower angles of the pronotum, scutellum, post-tergite, mesepimeron, and metathorax which are black. Coxae orange-yellow, base of hind coxa black; trochanters white; femora orange-yellow; fore and mid tibiae orange-yellow with extreme apices white; hind tibia black with extreme base white; tarsi orange-yellow, infuscated apically with hind tarsus more darkly so. Abdomen rufous with basal plates and anterior half of second tergum black; infuscate areas on apical segments and sheath.

General structure as for genus. Head smooth and shining; fine punctures and short dark hairs on para-antennal fields, supra-clypeal area, malar areas, and genal areas. Clypeus roughened, slightly emarginate. Thorax smooth and shining; prothorax finely punctate; scutellum with several large punctures on lateral and posterior margins. Prepectus present as a distinct sclerite, separated from the episternum by a suture. Tarsal claws each with a small inner tooth, situated at the base some distance from the outer tooth. Sheath with base broad, apex acute (fig. 15). Lance and lancet as in figs. 23, 24, and 25.

*Male*.—Length, 6.3 mm. Color similar to the female except the legs which are entirely orange-yellow with apices of tarsi infuscate, and the abdomen which is black with rufous areas on terga 3 to 5 and sterna 1 to 5. Structure as for female. Genitalia as in figs. 7, 8, and 9.

*Type*.—There is a specimen labeled as type in the Peabody Museum of Natural History, Yale University. The type bears the data "Ct. 1875." Associated with this is a specimen bearing the label "Alotype" with the data "Mass. 1876" (Correspondence, D. C. Ferguson, 1964).

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Figs. 1-3, 13, 20-22, *H. primarius*, n. sp. Figs. 4-6, 14, 17-19, *H. multicinctus* Hall. Figs. 7-9, 15, 23-25, *H. dubitatus* (Norton). Figs. 10-12, 16, 26-28, *H. albidopictus* (Norton). 1, 4, 7, 10, **harpe**; 2, 5, 8, 11, **parapenis**; 3, 6, 9, 12, **penis valve**; 13-16, **sheath**; 17, 20, 23, 26, **lance**; 18, 21, 24, 27, **lancet**; 19, 22, 25, 28, **detail of lancet**.



Although the localities on these specimens agree with those in Norton's original description, the dates of collection, if they are such, are 13 and 14 years after the description. The exact location of the type is unknown except for this information.

*Type locality*.—"Ct." (?).

*Distribution*.—Eastern North America: Connecticut, District of Columbia, Illinois, Indiana, Massachusetts, Maine, Maryland, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Ontario, Pennsylvania, Quebec, Texas, Virginia, Wisconsin.

*Hosts*.—*Osmunda*, *Onoclea*, *Pteridium*? (Krombein, 1960).

The color pattern varies considerably in both sexes. The pectus and mesepisternum may be entirely rufous or entirely black, but never of different colors. The dorsum of the thorax varies from nearly entirely rufous to nearly entirely black, with all intermediates. This species is easily separated from *albidopictus* by the prepectus, coloration, sheath shape and genitalia, and from *multicinctus* and *primarius* by the small inner tooth of each tarsal claw and coloration.

Dyar (1897) reared this species on *Onoclea* and described the last two larval instars. Maxwell (1955) obtained larvae from *Osmunda* and described the internal anatomy. Prepupae were found in sumach pith in Virginia by Krombein (1960) and adults reared from these.

#### **Hemitaxonus multicinctus** Hall

*Hemitaxonus multicinctus* Hall, 1917, Proc. Ent. Soc. Wash. 19:28, egg, larva; Ross, 1951, in Muesebeck *et al.*, U.S. Dept. Agr., Agr. Monogr. 2:22.

*Female*.—Length, 7.0 mm. Head and antennae black; clypeus and labrum white. Thorax black; tegulae and upper angles of pronotum white; a large triangular rufous area on mesepisternum with a smaller rufous area dorsal to it. Legs orange-yellow to white; tibiae and tarsi infuscate. Abdomen straw-colored; basal plates, sheath, and cerci black; areas on lateral margins and basal and apical terga infuscate.

General structure as for genus. Head smooth and shining with fine punctures and short hairs on para-antennal fields, supraclypeal area, malar areas, and genal areas. Clypeus roughened, slightly emarginate. Thorax smooth and shining; prothorax finely punctate. Prepectus present as a distinct sclerite, separated from the episternum by a suture. Tarsal claws simple. Sheath with base broad, apex acute (fig. 14). Lance and lancet as in fig. 17, 18, and 19.

*Male*.—Length, 6.1 mm. Color and structure as in the female. Genitalia as in figs. 4, 5, and 6.

*Type*.—A manuscript type bearing Rohwer's authorship is in the U.S. National Museum, Type No. 18701. Hall published the manuscript name in a biological note, therefore receiving credit for the species. In Hall's paper only the eggs and larvae are mentioned, and these are in the U.S. National Museum. I am considering this series of eggs and larvae as cotypes, and one larva has been chosen as the

lectotype. This has been assigned U.S.N.M. No. 68050 and bears a label with the following data: "Wakeman, O., W. B. Hall."

*Type locality*.—Wakeman, Ohio.

*Distribution*.—Eastern North America: Maryland, Ohio.

*Host*.—*Athyrium thelypteroides*.

The adults available seem positively enough associated with the larvae since Hall probably reared these from representatives of the larval series, and adults and larvae are present in the same vial in the collection. Larval relationships are difficult to determine at present because of the lack of material of larvae of other species of *Hemitaxonus*, but the adults are very distinct from other members of the genus.

This species may be separated from *dubitatus* and *albidopictus* by the simple tarsal claws and coloration, and from *primarius* by sheath shape and coloration.

Hall collected specimens from the above host in a cultivated fern bed, the plants being native to Ohio. He stated that the "eggs are attached on end to the upper side of the leaf, often as many as ten or twelve on a frond."

#### ***Hemitaxonus primarius*, new species**

*Female*.—Length, 7.2 mm. Head black; clypeus, base of mandibles and rest of mouthparts white; antenna with the two basal segments light rufous, flagellum black. Thorax black; hind margins of pronotum white; tegulae, a large triangular area on mesepisternum, and lateral areas of pronotum light rufous. Legs white to orange-yellow; tarsi infusate. Abdomen orange; sheath and cerci black.

Antenna long and slender; first segment globular, second segment as wide as long; third and fourth segments subequal in length; remaining segments gradually decreasing in length. Head with vertex and frons smooth and shining; punctures and short dark hairs on para-antennal fields, supra-clypeal area, malar areas, and genal areas; upper inner orbits of eyes with roughened areas; a circular ridge on the frons posterior to the antennae and including the front ocellus; malar space wider than the diameter of the front ocellus; genal carinae present; clypeus roughened, slightly emarginate. Thorax smooth and shining; pronotum finely punctate. Prepectus present as a distinct sclerite, separated from the episternum by a suture. Tarsal claws simple. Fore wing with anal cross vein present; proximal anal cell twice the length of the distal anal cell; Rs + M curved. Sheath long and narrow, the dorsal and ventral margins subparallel, gradually tapering to a rounded apex (fig. 13). Lance slightly wider in center than at base (fig. 20); lance with three groups of irregularly shaped teeth on apical third (fig. 21 and 22).

*Male*.—Length, 7.0 mm. Color similar to the female except for the abdomen which is dark rufous. General structure as for female. Harpes with inner margins protuberant (fig. 1); parapenis as in fig. 2; penis valves with dorsal and ventral margins slightly protuberant (fig. 3).

*Holotype*.—Female, Lagunitas, California, April 7, 1946, elevation 1000', H. P. Chandler, U.S.N.M. Type No. 67983.

*Allotype*.—Male, Saddleback Mountain, Lincoln Co., Oregon, April 30, 1960, J. C. Dirks-Edmunds.

*Paratypes*.—BRITISH COLUMBIA: Steelhead, May 23, 1933, H. B. Leech (1 ♀). CALIFORNIA: Lake Pilarcites, San Mateo Co., April 16, 1939, E. C. VanDyke (1 ♀); Mt. View, August 10, 1902, Ehrhorn (1 ♀). OREGON: Benton Co., Mary's Peak, March 27, 1964, rotary trap (1 ♂); Benton Co., Mary's Peak, May 16, 1963 (1 ♀); 4 mi. N. Harlan, Lincoln Co., April 7, 1960, G. P. Carpenter (1 ♂).

*Disposition of paratypes*.—Paratypes have been distributed among the following: the California Academy of Sciences, the Illinois Natural History Survey, Oregon State University, and the U.S. National Museum.

*Specimens examined*.—8.

*Host*.—Unknown.

The color of the dorsum of the thorax and abdomen ranged from black to rufous in the females examined but was dark in all the males. The first and second antennal segments were both rufous, both black, or the first segment rufous and the second segment black.

The females of this species are easily separated from other members of the genus by the distinct shape of the sheath. Otherwise, both sexes differ from *albidopictus* by the prepectus, tarsal claws, coloration, and genitalia, from *dubitatus* by the tarsal claws, and coloration, and from *multicinctus* by genitalia.

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#### NOTES ON THE TYPES OF TEPHRITIDAE DESCRIBED BY R. W. DOANE (DIPTERA)

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In 1898 and 1899, R. W. Doane of the then Washington Agricultural College and School of Science at Pullman described 21 tephritid species in what eventually proved to be an important segment of American taxonomic literature on fruit flies. Of the names proposed by Doane,